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EXAMINER
DOUGHERTY, ANTHONY T

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/800,977	Applicant(s) WEGERICH, STEPHAN W.	
	Examiner Anthony T. Dougherty	Art Unit 2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 24-30* is/are rejected.

7)☒ Claim(s) *23 and 31-34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6,7,8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4-9, 11, 13, 14-17, 19, 20, 22, and 24-27 rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,539,343 to Zhao et al.

With regard to claim 1, Zhao et al. discloses a system for extracting information from a complex signal (see abstract), with a decomposition module to derive a snapshot of input signal components from the complex signal (see column 3line 29 through line 42), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through line 44), and comparing input signal components against reference snapshots to provide a similarity measure which provides information about the state of the complex signal (see column 5 line 4 through line 12).

With regard to claim 2 and applying the rejection of claim 1 above, Zhao et al. discloses using wavelet analysis to decompose the complex signal into a plurality of component coefficients (see column 3 line 45 through line 47).

With regard to claim 4 and applying the rejection of claim 1 above, Zhao et al. discloses a similarity measure as a function of elemental similarity values between corresponding components of the input and a reference (see column 5 line 11 through line 12).

With regard to claim 5 and applying the rejection of claim 4 above, Zhao et al. discloses generating a similarity measure for a selected component according to a range of minimum and maximum values of that component across the reference (see column 5 line 23 through line 30).

With regard to claim 6 and applying the rejection of claim 1 above, Zhao et al. discloses the complex signal is a communication signal (see column 4 line 10 through line 18), the system having a lookup table (see column 4 line 1 through line 9), matching a snapshot with a reference snapshot in memory based on at least one similarity measure (see column 5 line 4 through line 12), matching reference snapshot identifying an entry in the lookup table (see column 4 line 1 through line 9), and the identified lookup table entry being presented as an output of the system (see column 4 line 10 through line 18).

With regard to claim 7 and applying the rejection of claim 1 above, Zhao et al. discloses combining an expected value and a corresponding signal to determine a residual value (see

column 5 line 58 through line 60), and a test unit for determining a deviation based on the residual (see column 5 line 61 through line 62).

With regard to claim 8 and applying the rejection of claim 7 above, Zhao et al. discloses a diagnostic unit responsive to deviations from a test unit for generating a diagnosis of a condition in the operation of the monitored system (see column 5 line 62 through line 65).

With regard to claim 9 and applying the rejection of claim 7 above, Zhao et al. discloses the test unit applies a threshold to the residual to determine a deviation (see column 5 line 23 through line 30 & column 5 line 63 through line 65).

With regard to claim 11, Zhao et al. discloses monitoring the operating condition of a system (see abstract) by a sensor means for acquiring a time-varying signal characterizing operation of the system (see column 3 line 29 through line 44), means for decomposing the time-varying signal into a plurality of components (see column 3 line 45 through line 67), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through line 44), it is inherent to Zhao et al. that a processor means is used – it is inherent because the disclosure speaks of comparisons and analysis that can only be accomplished in the processing system described by the use of a

processing means (see column 4 line 1 through line 29), the processing means generating estimates of components using a similarity operation on the component values from the decomposing means with reference to component values in each reference snapshot in memory (see column 5 line 4 through line 12), generating residual values by differencing component values and estimates (see column 5 line 58 through line 60), for determining deviating operating conditions of the system (see column 5 line 62 through line 65).

With regard to claim 13 and applying the rejection of claim 11 above, Zhao et al. discloses generating estimates by comparison within an expected range (see column 5 line 23 through line 30).

With regard to claim 14, Zhao et al. discloses classifying a state of a system (see abstract) by a sensor means for acquiring a time-varying signal characterizing operation of the system (see column 3 line 29 through line 44), means for decomposing the time-varying signal into a plurality of components (see column 3 line 45 through line 67), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through line 44), it is inherent to Zhao et al. that a processor means is used – it is inherent because the disclosure speaks of comparisons and analysis that can only be accomplished in the processing system described by the use of a processing means (see column 4

line 1 through line 29), the processing means generating estimates of components using a similarity operation on the component values from the decomposing means with reference to component values in each reference snapshot in memory (see column 5 line 4 through line 6), and determine if the system is in a known state based on the similarity value (see column 5 line 6 through line 12).

With regard to claim 15 and applying the rejection of claim 14 above, Zhao et al. discloses a plurality of snapshots of component values representing a plurality of known states (see column 5 line 4 through line 11), and the known state associated with the reference snapshot having the highest generated similarity value (see column 5 line 11 through line 12).

With regard to claim 16 and applying the rejection of claim 15 above, Zhao et al. discloses each known state represented in the memory has just one reference snapshot associated with it (see column 4 line 1 through line 18).

With regard to claim 17 and applying the rejection of claim 14 above, Zhao et al. discloses using wavelet analysis to decompose the time-varying signal into coefficients (see column 3 line 45 through line 47).

With regard to claim 19, Zhao et al. discloses providing a reference library of representative sets of correlated values for use in monitoring a system using an empirical model (see abstract) by receiving a variable signal measuring a parameter of the system during

operation in a known mode (see column 3 line 29 through line 44), for decomposing the variable signal into component signals (see column 3 line 45 through line 67), periodically sampling component signals to provide successive sets of correlated values (see column 3 line 45 through line 67), selecting some of said sets for inclusion in reference library (see column 4 line 1 through line 9).

With regard to claim 20 and applying the rejection of claim 19 above, decomposing the variable signal with a discrete wavelet transformation to produce component signals comprising successive wavelet coefficients (see column 3 line 45 through line 67 & column 4 line 44 through line 47).

With regard to claim 22 and applying the rejection of claim 19 above, Zhao et al. discloses storing a classification with a selected set of correlated values associated with a known state of the variable signal (see column 4 line 1 through line 18).

With regard to claim 24, Zhao et al. discloses classifying a state of a system (see abstract) receiving a time-varying signal characterizing the system (see column 3 line 29 through line 44), decomposing the time-varying signal into a plurality of components (see column 3 line 45 through line 67), generating a similarity value for a comparison of decomposed components and a reference set of component values (see column 5 line 4 through line 6) the reference set of component values representing a known state of the system (see column 3 line 42 through line

44), determining if the system is a known state based on the similarity value (see column 5 line 6 through line 12).

With regard to claim 25 and applying the rejection of claim 24 above, Zhao et al. discloses generating a similarity value for each comparison of the decomposed components to each of a plurality of reference sets of component values (see column 5 line 4 through line 6), the reference sets of component values characterizing known states of the system (see column 3 line 42 through line 44), and the determining step comprises selecting the known state associated with the reference set having the highest generated similarity value as the determined state of the system (see column 5 line 11 through line 12).

With regard to claim 26 and applying the rejection of claim 25 above, Zhao et al. discloses each known state has just one reference set of component values associated with it (see column 4 line 1 through line 18).

With regard to claim 27 and applying the rejection of claim 24 above, Zhao et al. discloses using wavelet analysis to decompose the time-varying signal into coefficients (see column 3 line 45 through line 47).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3, 18, 21, and 28 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,539,343 to Zhao et al. in view of U.S. Patent No. 5,526,446 to Adelson et al.

With regard to claim 3 the primary reference to Zhao et al. discloses a system for extracting information from a complex signal (see abstract), with a decomposition module to derive a snapshot of input signal components from the complex signal (see column 3line 29 through line 42), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through line 44), and comparing input signal components against reference snapshots to provide a similarity measure which provides information about the state of the complex signal (see column 5 line 4 through line 12). However, Zhao et al. fails to disclose decomposing a signal based on frequency filters.

The secondary reference to Adelson et al. discloses frequency filters used to decompose a signal (see column 2 line 12 through line 27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified the invention of Zhao et al. use frequency filters to decompose a signal.

Accordingly, such a modification would have been obvious since Adelson et al. teaches decomposing a signal by frequency filters allows one to distinguish noise from signal information and thus obtain a more accurate measurement of the signal than one with noise included in the measurement (see column 2 line 19 through line 22), thereby suggesting the obviousness of the modification.

With regard to claim 18 the primary reference to Zhao et al. discloses classifying a state of a system (see abstract) by a sensor means for acquiring a time-varying signal characterizing operation of the system (see column 3 line 29 through line 44), means for decomposing the time-varying signal into a plurality of components (see column 3 line 45 through line 67), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through line 44), it is inherent to Zhao et al. that a processor means is used – it is inherent because the disclosure speaks of comparisons and analysis that can only be accomplished in the processing system described by the use of a processing means (see column 4 line 1 through line 29), the processing means generating estimates of components using a similarity operation on the component values from the decomposing means with reference to component values in each reference snapshot in memory (see column 5 line 4 through line 6), and determine if the system is in a known state based on the

similarity value (see column 5 line 6 through line 12). However, Zhao et al. fails to disclose decomposing a signal based on frequency filters.

The secondary reference to Adelson et al. discloses frequency filters used to decompose a signal (see column 2 line 12 through line 27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified the invention of Zhao et al. use frequency filters to decompose a signal.

Accordingly, such a modification would have been obvious since Adelson et al. teaches decomposing a signal by frequency filters allows one to distinguish noise from signal information and thus obtain a more accurate measurement of the signal than one with noise included in the measurement (see column 2 line 19 through line 22), thereby suggesting the obviousness of the modification.

With regard to claim 21 the primary reference to Zhao et al. discloses providing a reference library of representative sets of correlated values for use in monitoring a system using an empirical model (see abstract) by receiving a variable signal measuring a parameter of the system during operation in a known mode (see column 3 line 29 through line 44), for decomposing the variable signal into component signals (see column 3 line 45 through line 67), periodically sampling component signals to provide successive sets of correlated values (see column 3 line 45 through line 67), selecting some of said sets for inclusion in reference library (see column 4 line 1 through line 9). However, Zhao et al. fails to disclose decomposing a signal based on frequency filters.

The secondary reference to Adelson et al. discloses frequency filters used to decompose a signal (see column 2 line 12 through line 27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified the invention of Zhao et al. use frequency filters to decompose a signal.

Accordingly, such a modification would have been obvious since Adelson et al. teaches decomposing a signal by frequency filters allows one to distinguish noise from signal information and thus obtain a more accurate measurement of the signal than one with noise included in the measurement (see column 2 line 19 through line 22), thereby suggesting the obviousness of the modification.

With regard to claim 28 the primary reference to Zhao et al. discloses classifying a state of a system (see abstract) receiving a time-varying signal characterizing the system (see column 3 line 29 through line 44), decomposing the time-varying signal into a plurality of components (see column 3 line 45 through line 67), generating a similarity value for a comparison of decomposed components and a reference set of component values (see column 5 line 4 through line 6) the reference set of component values representing a known state of the system (see column 3 line 42 through line 44), determining if the system is a known state based on the similarity value (see column 5 line 6 through line 12). However, Zhao et al. fails to disclose decomposing a signal based on frequency filters.

The secondary reference to Adelson et al. discloses frequency filters used to decompose a signal (see column 2 line 12 through line 27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified the invention of Zhao et al. use frequency filters to decompose a signal.

Accordingly, such a modification would have been obvious since Adelson et al. teaches decomposing a signal by frequency filters allows one to distinguish noise from signal information and thus obtain a more accurate measurement of the signal than one with noise included in the measurement (see column 2 line 19 through line 22), thereby suggesting the obviousness of the modification.

5. Claims 10 and 12 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,539,343 to Zhao et al. in view of U.S. Patent No. 5,459,675 to Gross et al.

With regard to claim 10 the primary reference to Zhao et al. discloses a system for extracting information from a complex signal (see abstract), with a decomposition module to derive a snapshot of input signal components from the complex signal (see column 3line 29 through line 42), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through line 44), and comparing input signal components against reference snapshots to provide a similarity measure which provides information about the state of the complex signal (see column

5 line 4 through line 12). However, Zhao et al. fails to disclose applying a sequential probability ratio test to a sequence of values of a residual to determine a deviation.

The secondary reference to Gross et al. discloses applying a sequential probability ratio test to a sequence of values of a residual to determine a deviation (see last four line of abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified Zhao et al. use a sequential probability ratio test of values of a residual to determine a deviation.

Accordingly, such a modification would have been obvious since Gross et al. teaches that a sequential probability ratio allows for early annunciation of the onset of a disturbance in noisy process variables and has user specifiable alarms and missed alarm probabilities (see column 1 line 29 through line 36) allowing for a more accurate system with respect to alarm frequency and validity, thereby suggesting the obviousness of the modification.

With regard to claim 12 the primary reference to Zhao et al. discloses monitoring the operating condition of a system (see abstract) by a sensor means for acquiring a time-varying signal characterizing operation of the system (see column 3 line 29 through line 44), means for decomposing the time-varying signal into a plurality of components (see column 3 line 45 through line 67), it is inherent to Zhao et al. that a memory is used for storing reference snapshots – it is inherent because the disclosure speaks of collecting training data and constructing signal templates which cannot be done within a processing system as described without a memory for storing the data (see column 4 line 10 through line 29), the reference snapshots characterizing recognized states of the complex signal (see column 3 line 42 through

line 44), it is inherent to Zhao et al. that a processor means is used – it is inherent because the disclosure speaks of comparisons and analysis that can only be accomplished in the processing system described by the use of a processing means (see column 4 line 1 through line 29), the processing means generating estimates of components using a similarity operation on the component values from the decomposing means with reference to component values in each reference snapshot in memory (see column 5 line 4 through line 12), generating residual values by differencing component values and estimates (see column 5 line 58 through line 60), for determining deviating operating conditions of the system (see column 5 line 62 through line 65). However, Zhao et al. fails to disclose applying a sequential probability ratio test to a sequence of values of a residual to determine a deviation.

The secondary reference to Gross et al. discloses applying a sequential probability ratio test to a sequence of values of a residual to determine a deviation (see last four line of abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified Zhao et al. use a sequential probability ratio test of values of a residual to determine a deviation.

Accordingly, such a modification would have been obvious since Gross et al. teaches that a sequential probability ratio allows for early annunciation of the onset of a disturbance in noisy process variables and has user specifiable alarms and missed alarm probabilities (see column 1 line 29 through line 36) allowing for a more accurate system with respect to alarm frequency and validity, thereby suggesting the obviousness of the modification.

6. Claims 29 and 30 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,539,343 to Zhao et al. in view of U.S. Patent No. 5,799,043 to Chang et al.

With regard to claim 29 the primary reference to Zhao et al. discloses extracting information from a complex signal (see abstract) by receiving a complex signal carrying data (see column 3 line 33 through line 35), periodically decomposing the complex signal into a plurality of components (see column 3 line 45 through line 67 & column 4 line 44 through line 49 & Figure 2b), comparing components against a plurality of snapshots in a storage set of historical components (see column 4 line 64 through column 5 line 12). However, Zhao et al. fails to disclose averaging comparison results to provide an indication of information in complex signals.

The secondary reference to Chang et al. discloses averaging comparison results to provide an indication of information in complex signals (see column 7 line 1 through line 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have specified Zhao et al. average comparison results to provide an indication of information in complex signals.

Accordingly, such a modification would have been obvious since Chang et al. teaches that averaging comparison results reduces error in the output due to erroneous results (see column 7 line 7 through line 9), thereby suggesting the obviousness of the modification.

With regard to claim 30 and applying the rejection of claim 29 above, Zhao et al. discloses extracting wavelet details from the complex signal (see column 3 line 45 through line 47).

Allowable Subject Matter

7. Claims 23 and 31-34 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claim 23 is the inclusion of the method step of providing a reference library of representative sets by including a particular set of correlated values if the set includes a minimum or maximum value of one of the correlated values as compared to all like values in all the sets of correlated values. It is this step found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 31-34 is the inclusion of the method step of extracting information from a complex signal by applying a bounded area ratio test to a plurality of components of a complex signal for comparison against reference snapshots of complex signals. It is this step found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,987,399 to Wegerich et al. because it teaches the use of a bounded area ratio test in comparison decomposed signals.

U.S. Patent No. 6,181,975 to Gross et al. because it teaches decomposing signals from a system and comparing them to identify a data pattern indicative of an operating state of the system.

U.S. Patent No. 5,745,382 top Vilim et al. because it teaches the use of wavelet analysis versus neural network analysis in the decomposition of complex signals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony T. Dougherty whose telephone number is (703) 305-4020. The examiner can normally be reached on Monday through Friday from 8 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (703) 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

atd
June 10, 2003

John Barlow
Supervisory Patent Examiner
Technology Center 2800